At-Scale Implementation and the Perils of Fragmentation

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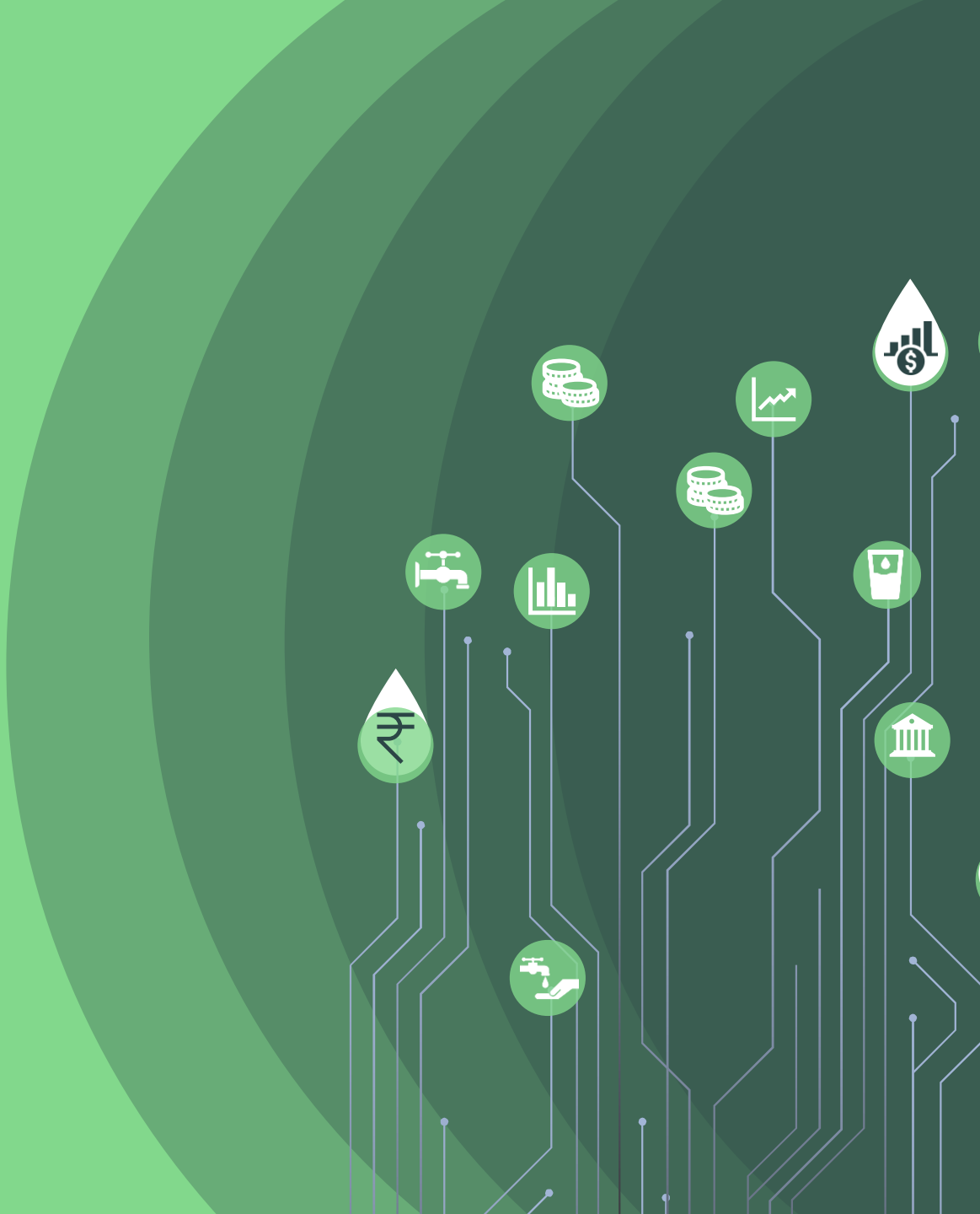


Introduction

- Tackling development challenges (e.g. access to sanitation) require scale, and policies that relax multiple constraints simultaneously.

- Development requires state capacity, which itself is endogenous to development (Besley and Persson, 2009; 2011; Besley, 2020)

"Achieving growth and resilience: governments can't do it alone" *(Loayza, 2023)*

Introduction

- In practice, multi-actor delivery models common (e.g., PPPs or contracting out):
  - PPPs contribution to investments in physical and social infrastructure; ~10% of annual infrastructure investment by LMIC governments (Fabre & Straub, 2021)
  - "If NGOs were a country, they would have the 5th largest economy in the world." (2018 Global NGO Technology Report)
- As coordination costs rise with scale (Mani, 2021), multi-actor delivery vulnerable to fragmentation.
- **Organizational fragmentation**: the delivery of interventions by separate actors with no guarantee that emphasized complementarities will be realized.

This paper…

- We provide causal evidence that the delivery of theoretically complementary interventions in a multi-actor delivery context can generate practical frictions that lead to **outcomes short of policy objectives…**

…even when individual components are effective in isolation.

This paper...

- We leverage:
  - **Randomized at-scale implementation** of private sector MFI and NGO info campaign, implemented in the context of...
  - The flagship SBM government policy, providing IEC and subsidies, with **quasi-random variation** in its delivery.

- We show that:
  - NGO information provision can lead to **reduced** toilet adoption when delivery is fragmented across actors.
  - **Mechanism**: NGO info creates household expectations about complementarities (betw. MFI and gvnmt subsidies) that fail to materialize.

Contributions

- **Science of Scaling:** why interventions experience 'voltage drops' (Al-Ubaydli et al., 2023) at scale: diminishing marginal returns, general-equilibrium spillovers, and declines in implementation fidelity (Bold et al., 2018; Muralidharan & Niehaus 2017; Vivalt, 2020; List et al., 2022; Pritchett et al., 2013)

  → We add channel of ***fragmented delivery***

  Related to literature on (i) **multi-tasking** (can overburden frontline providers and reduce effectiveness (Banerjee et al., 2015; Briceno et al., 2017; Olken et al., 2014), even negating successful interventions (Yousafazi et al., 2014); and (ii) negative impacts of **intervention delays** (Gine et al., 2024)

- Organizational literature on **agency problems in public service delivery:** theory emphasizes how complementarities can generate multiple equilibria and coordination problems (Kremer, 1993; Acemoglu & Kremer, 1998); limited evidence in LMICs (Bardhan & Mookherjee, 2006; Mookherjee, 2006; Child et al., 2024)

  →We add empirical causal evidence in LMIC setting

Contribution

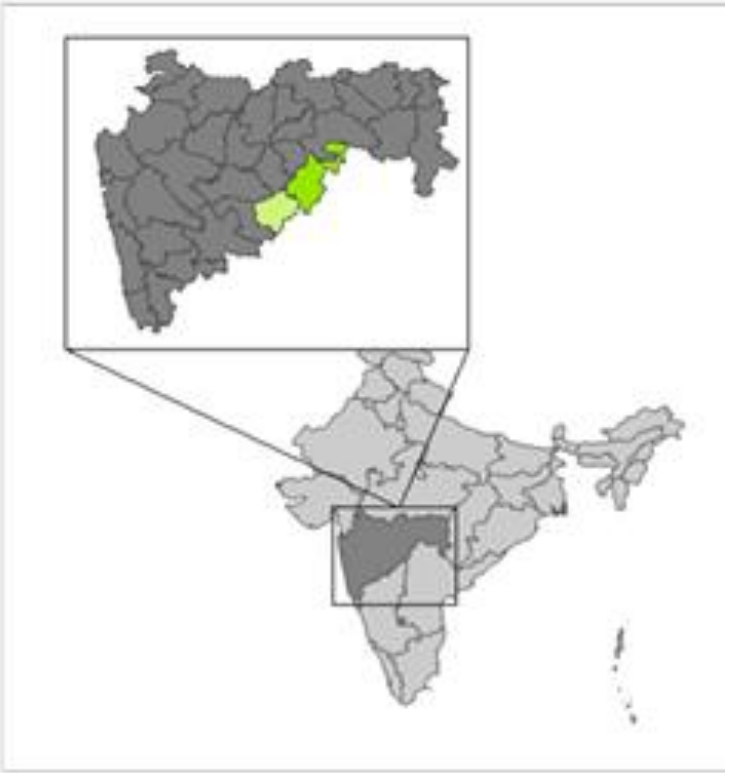
- **Sanitation technology adoption**: Substantial heterogeneity in various types of interventions (information, credit, subsidy etc. (Guiteras et al., 2015; Cameron et al., 2019; Briceno et al., 2017; Abramovsky et al., 2019; Cameron et al., 2021; Lipscomb & Schechter, 2018; Augsburg et al. 2023, 2024; BenYishay et al., 2017; Garn et al., 2017; Pickering et al., 2015)

  →Impacts may depend critically on coordination within public policy environment

Context

- 2015-2018 rural India
- Period where India had ‘dubious distinction of having the highest number of people defecating in the open’ (Mehta, 2018), costing equivalent of 6.4% of GDP (WSP, 2011)
- PM Modi's flagship SBM policy ("Clean India mission") to eliminate OD.

- **Latur and Nanded**, Maharashtra
  - 56.6% hold BPL card (46.3% rural India)
  - Mostly agricultural (over 70% of population)
  - Baseline toilet ownership lagging (24% in study households)



Context

- Affordability & financing:
  - Basic govt recommended toilet: 20% avg annual hh income
  - Actual construction costs: ~50% avg annual household income
  - Savings are the main source of financing (84%)
  - 83% of study households cite affordability and financing as main constraint
- Incorrect beliefs & lack of knowledge:
  - Significant variation in cost and benefit perceptions (Augsburg et al., 2023)
  - Continued OD even when infrastructure available (Coffey et al., 2014)
- Access to markets/skills/materials:
  - Within community access:
    - 92% have mason (constructed majority of existing toilets), 51% plumber;
    - 33% cement block producer, 20% brick producer; 18% sanitary hardware store;
  - If not in community: 7-17 km distance to travel

Interventions: MFI

1. Sanitation microloan (MFI)

- MFI operating in 5 Indian states, offering variety of collateral free loans;
- Female MFI clients, joint liability (5-10 women);
- Loans disbursed in cash
- No information or support on toilet models, materials, labour
- Sanitation loan product details:

Amount:	Up to INR 15,000 (US$ 250)
Interest rate:	22% (later 18%) per annum on a declining balance
Loan maturity:	2 years
Payment frequency:	Weekly/Bi-weekly basis
Collateral:	None, but joint-liability
Cost of the loan:	19.9% - 24.1 % of the amount disbursed depending on interest rate
Other costs:	Processing fee of 1.1% of principal and INR 306 for life insurance premium

Notes: As appears in [Augsburg et al. (2023)].

- Augsburg et al (2023): MFI loan increased toilet ownership

Interventions: NGO

- NGO active in area since 2005
- Content:
  1. Health, hygiene and women's safety benefits of sanitation,
  2. Availability of government subsidies.
- Approach:
  - Approval from GP *sarpanch*
  - Street plays, wall banners/posters, information leaflets
  - MFI client focused activities (during joint liability group meetings and branch level workshops)

Community level

Client level

Mason training

- Mixed evidence on effectiveness of similar approaches

Interventions: Govt Policy (SBM Phase I)

- Launched on 2 October 2014 to eradicate OD by 2 October 2019
- 2 key components:
  - Behaviour change IEC activities (<3% of the budget):
    - Variety of IEC activities similar to those by NGO
    - CLTS-type triggering meetings

    →SBM-G IEC and NGO awareness activities functioned as close substitutes
  - Subsidy:
    - INR 12,000 (USD $169)
    - Targeted to vulnerable groups (BPL households, etc) without a toilet at SBM-G baseline in 2012
    - Reimbursement after verification model

    →SBM-G subsidy and MFI loan likely function as complements
- SBM guidelines invited private sector and third sector organisations to step in, but **no specific guidance on partnership procedures**
- Evidence that SBM-G reduced open defecation (Joseph et al., 2023)

Research Design

- **Objective:** identify whether organizational fragmentation affects the effectiveness of multi-actor intervention bundles. [Is more always better?]
- **We exploit:**
  - Randomized implementation of MFI and NGO-led information campaign (120 GPs)
    - Control (41 GPs)
    - T1: Sanitation loan only (*MFI*, 40 GPs)
    - T2: Sanitation loan and NGO-led awareness creation (*MFI&NGO,* 39 GPs)
    - Note: No NGO only arm
    - Randomization stratified by MFI branch and village size
  - Quasi-random variation in delivery 'intensity' of SBM-G policy
    - Decentralized delivery to GPs & differences in higher-tier government support led to variation in implementation intensity,
    - Allows us to define high/low intensity SBM-G….
    - …which households could not predict
- MFI and NGO interventions delivered as planned → **organizational fragmentation due to low intensity (or null) implementation of SBM**

Data

- MFI client & household survey (4,200 clients)
  - Endline and baseline surveys approx. 2.5 years apart
  - Baseline survey with subset of endline respondents
  - Administrative records from MFI and MGO
  - **Key outcomes of interest:** sanitation loan take-up (MFI admin data) and ownership of a functioning toilet (household survey)

- Community-level data (GP officials) collected from the 120 GPs
  - Detailed information on sanitation activities, including SBM implementation in GP
  - At endline, cross-reference this with information from a local mason
  - **Obtain measure of SBM implementation intensity**

Estimation

$$Y_{ivs} = \alpha_0 + \gamma_1 MFI_{vs} * SBM^H_{vs} + \gamma_2 MFI\&NGO_{vs} * SBM^H_{vs}$$
$$+ \gamma_3 MFI_{vs} * SBM^L_{vs} + \gamma_4 MFI\&NGO_{vs} * SBM^L_{vs}$$
$$+ \beta_1 SBM^H_{vs} + \beta_2 X_{ivs} + \theta_s + \epsilon_{ivs}$$

Where

- MFI_{vs}=1 if the MFI sanitation loan was introduced in GP v, 0 otherwise;
- $MFI\&NGO_{vs}$=1 if NGO awareness creation was additionally introduced, 0 otherwise,
- SBM^H_{vs}=1 and SBM^L_{vs}=1 if GP v experienced a high or low SBM-G implementation intensity,
- X_{ivs} is a vector of controls and interviewer FEs; θ_s are stratum fixed effects
- Y_{ivs} is outcome variable of household i in GP v in stratum s

Outcomes of interest: sanitation loan uptake and functioning toilet ownership

Estimation

$$Y_{ivs} = \alpha_0 + \gamma_1 MFI_{vs} * SBM^H_{vs} + \gamma_2 MFI\&NGO_{vs} * SBM^H_{vs}$$
$$+ \gamma_3 MFI_{vs} * SBM^L_{vs} + \gamma_4 MFI\&NGO_{vs} * SBM^L_{vs}$$
$$+ \beta_1 SBM^H_{vs} + \beta_2 X_{ivs} + \theta_s + \epsilon_{ivs}$$

- Is layering interventions beneficial?

  Under SBM^H: $\gamma_2 - \gamma_1$ Under SBM^L: $\gamma_4 - \gamma_3$

- Does fragmented delivery matter?

  For sanitation loan: $\gamma_1 - \gamma_3$ For combined MFI&NGO: $\gamma_2 - \gamma_4$

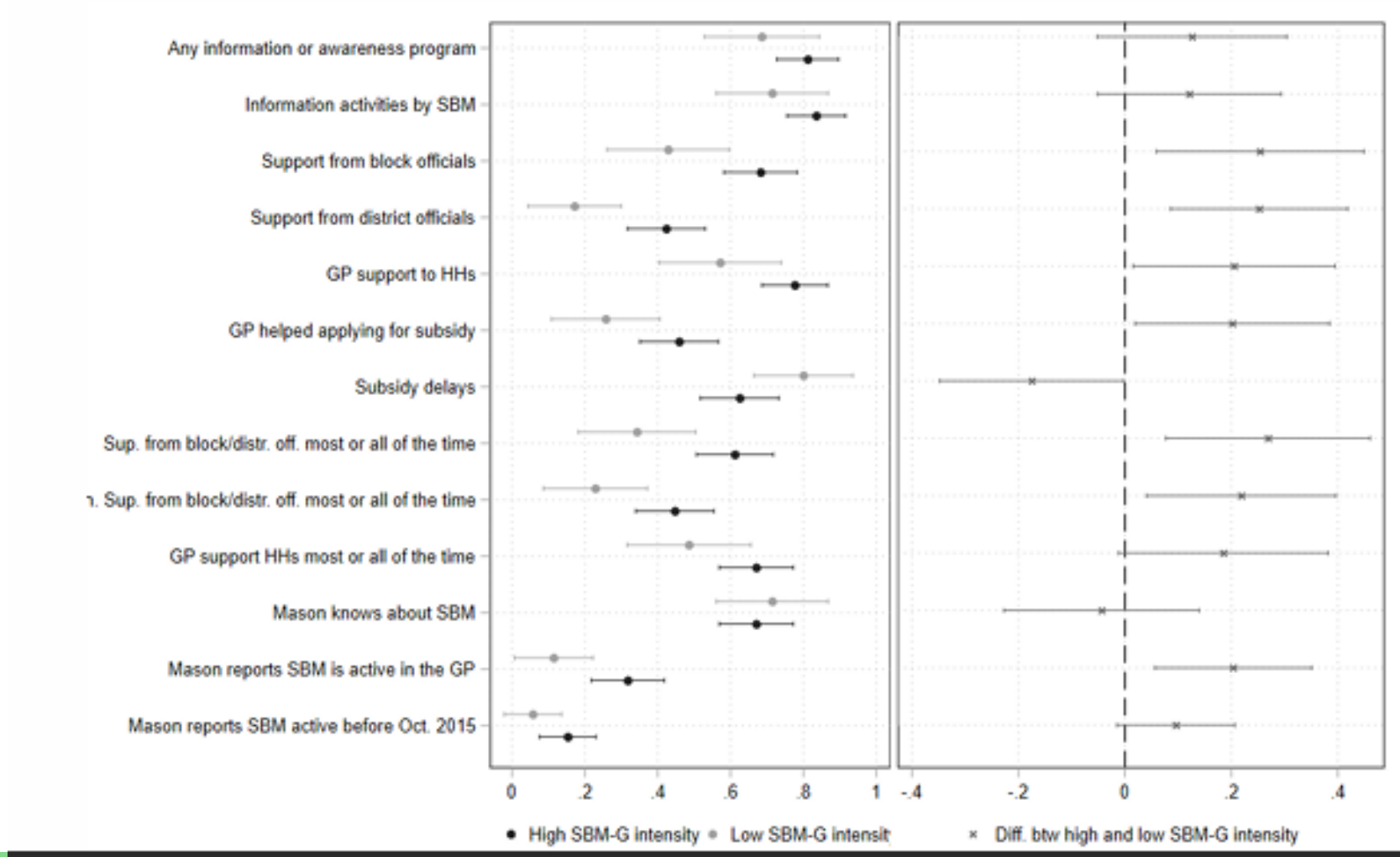
Identification

- MFI and MFI&NGO identified through random assignment
  - Samples balanced at baseline

- SBM^i $i \in \{H, L\}$ not exogenously implemented
  - Decentralized delivery to GPs led to significant local variation:
    - 11% GPs engaged in IEC activities, 26% lobbied higher-tier officials for resources, 22% facilitated bridge financing for households, 55% facilitated access to subsidies
  - Variation in higher-tier government support:
    - 61% of GPs received any support from block officials
    - 35% from district officials
    - 53% received support most or all of the time
  - Capture this variation through an **expectation-based measure:** GP officials' assessment of whether they expected their GP to achieve ODF status by 2019
    - Captures own planned activities and realized & anticipated support
    - In 2017, 70% expect to reach ODF status by 2019

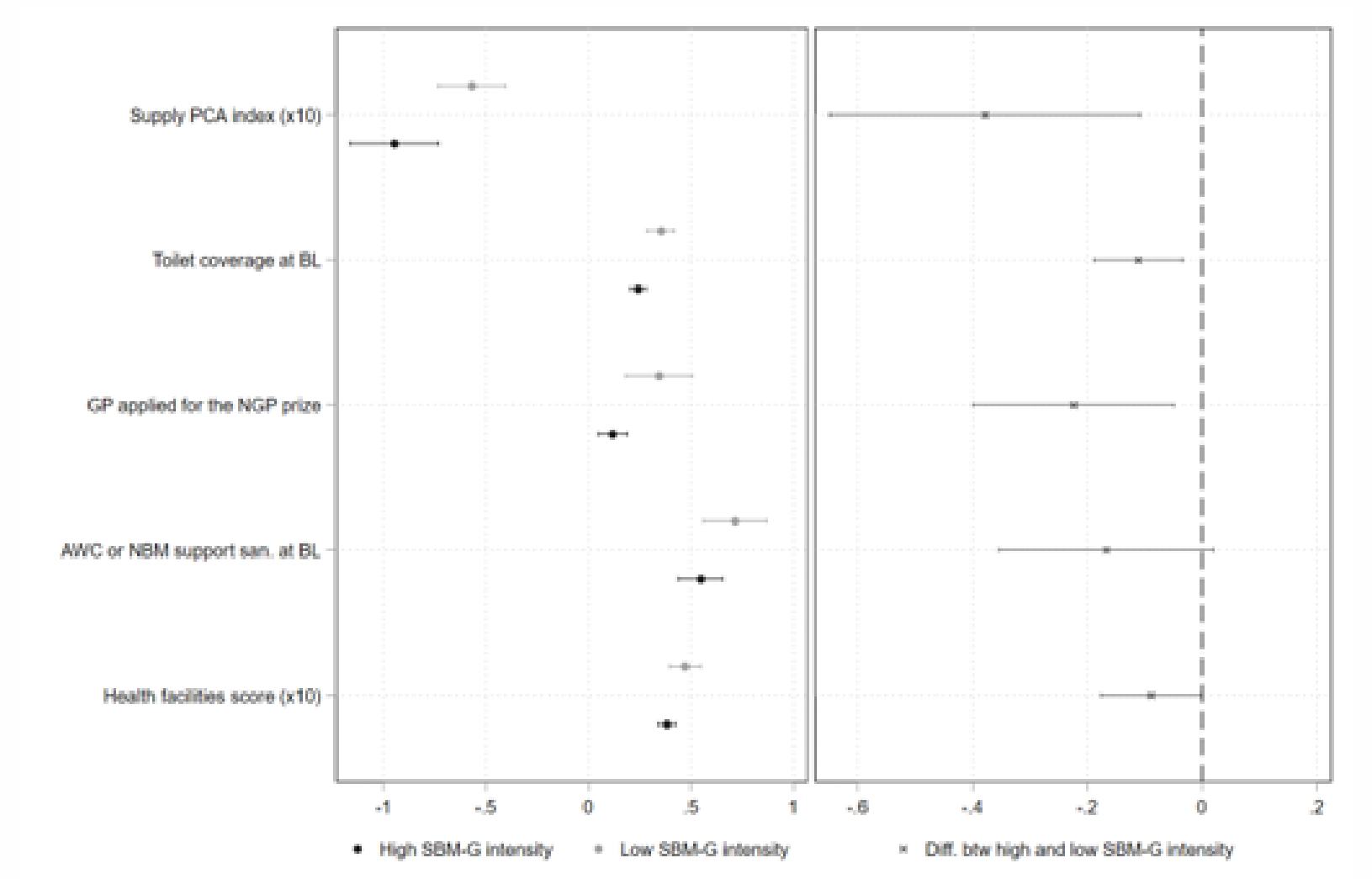
Identification

- SBM implementation intensity measure correlates strongly with implementation indicators



Identification

- SBM targeted to ‘lagging’ GPs:



Identification

- SBM GP targeting criteria not published or publicized by government
- Households had little basis to anticipate whether their own GP would be prioritised

	(1) SBM^L	(2) SBM^H	(3) P-value	(4) N
HHs think can get subsidy (%)	37.51	41.29	0.425	120
	(4.17)	(2.17)		

Notes: Sample is households without a toilet. Source: Baseline listing survey.

- Show that SBM implementation intensity is uncorrelated with wide range of observables:
  - Population size
  - Dominant economic activity
  - Accessibility
  - Availability of markets, shops, etc
  - Sarpanch characteristics.
  - Other govt programmes

Results

	Sanitation Loan
MFI + SBM^H (γ_1)	0.198***
	(0.047)
MFI + NGO + SBM^H (γ_2)	0.221***
	(0.034)
MFI + SBM^L (γ_3)	0.156***
	(0.055)
MFI + NGO + SBM^L (γ_4)	0.206***
	(0.057)
SBM^H	-0.024
	(0.046)
Covariates	Yes
F-test $\gamma_2 - \gamma_1 \neq 0$	0.590
F-test $\gamma_4 - \gamma_3 \neq 0$	0.487
F-test $\gamma_3 - \gamma_1 \neq 0$	0.566
F-test $\gamma_4 - \gamma_2 \neq 0$	0.816
Control mean (SBM^H)	0.017
Control mean (SBM^L)	0.006
Observations	4222

- Is layering NGO information beneficial?
  - Under SBM^H: $\gamma_2 - \gamma_1$
  - Under SBM^L: $\gamma_4 - \gamma_3$

→Not when $SBM^H = 1$

→Maybe yes when $SBM^L = 1$

→No strong evidence that layering NGO info matters for borrowing decision

→Suggestive evidence that it substitutes IEC from SBM-G when $SBM^L = 1$

Results

	Sanitation Loan
MFI + SBM^H (γ_1)	0.198***
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Observations	4222

- Does fragmented delivery matter?
  - Under SBM^H: $\gamma_1 - \gamma_3$
  - Under SBM^L: $\gamma_2 - \gamma_4$

→Maybe yes when NGO = 0

→Not when NGO = 1

→ **No strong evidence that fragmented delivery matters for borrowing decision**

Results: Toilet Adoption

	Functioning toilet
MFI + SBM^H (γ_1)	0.107***
	(0.027)
MFI + NGO + SBM^H (γ_2)	0.070**
	(0.028)
MFI + SBM^L (γ_3)	0.065
	(0.047)
MFI + NGO + SBM^L (γ_4)	-0.045
	(0.040)
SBM^H	-0.023
	(0.035)
Covariates	Yes
F-test $\gamma_2 - \gamma_1 \neq 0$	0.160
F-test $\gamma_4 - \gamma_3 \neq 0$	0.023
F-test $\gamma_3 - \gamma_1 \neq 0$	0.445
F-test $\gamma_4 - \gamma_2 \neq 0$	0.022
Control mean (SBM^H)	0.355
Control mean (SBM^L)	0.429
Observations	4222

- Is layering NGO information beneficial?
  - Under SBM^H: $\gamma_2 - \gamma_1$
  - Under SBM^L: $\gamma_4 - \gamma_3$

→ Maybe when $SBM^H = 1$

→ Not when $SBM^L = 1$

→Layering NGO information is detrimental for toilet construction

Results: Toilet Adoption

	Functioning toilet
MFI + SBM^H (γ_1)	0.107***
	(0.027)
MFI + NGO + SBM^H (γ_2)	0.070**
	(0.028)
MFI + SBM^L (γ_3)	0.065
	(0.047)
MFI + NGO + SBM^L (γ_4)	-0.045
	(0.040)
SBM^H	-0.023
	(0.035)
Covariates	Yes
F-test $\gamma_2 - \gamma_1 \neq 0$	0.160
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Control mean (SBM^H)	0.355
Control mean (SBM^L)	0.429
Observations	4222

- Does fragmented delivery matter?
  - Under SBM^H: $\gamma_1 - \gamma_3$
  - Under SBM^L: $\gamma_2 - \gamma_4$

→ Maybe yes when NGO = 0

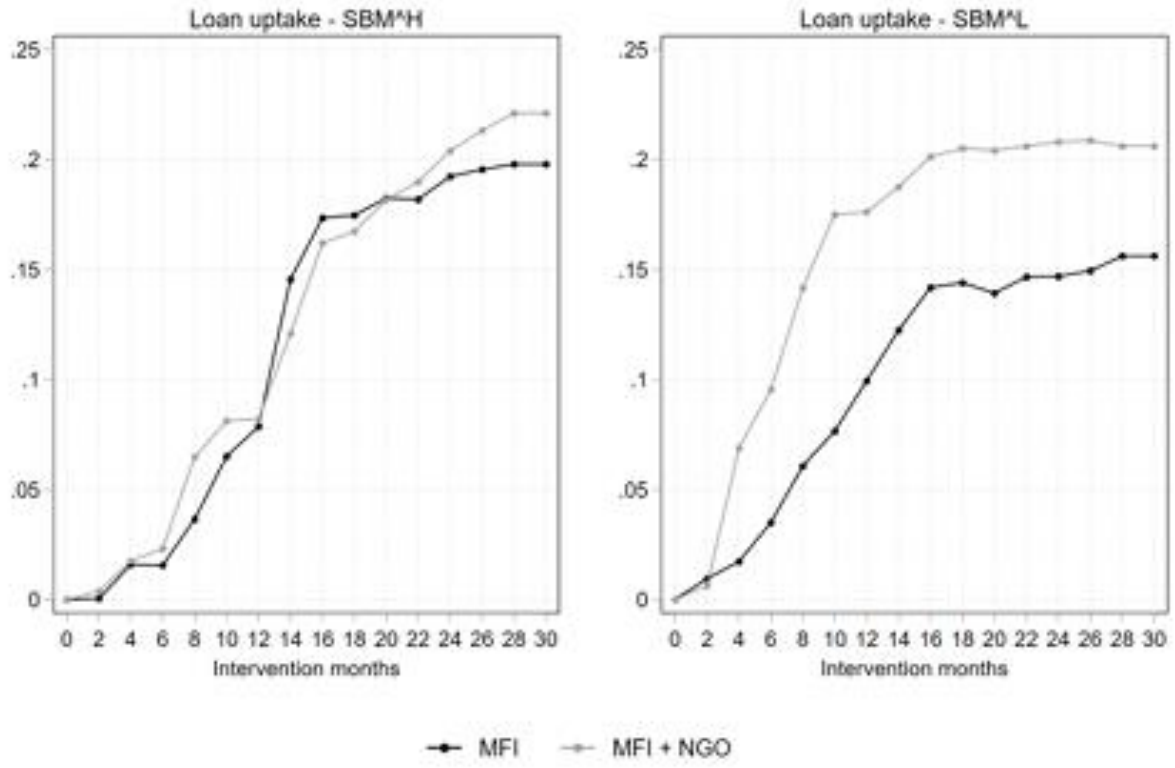
→ Definitely yes when NGO = 1

→ **Fragmented delivery detrimental for toilet construction**

Mechanisms

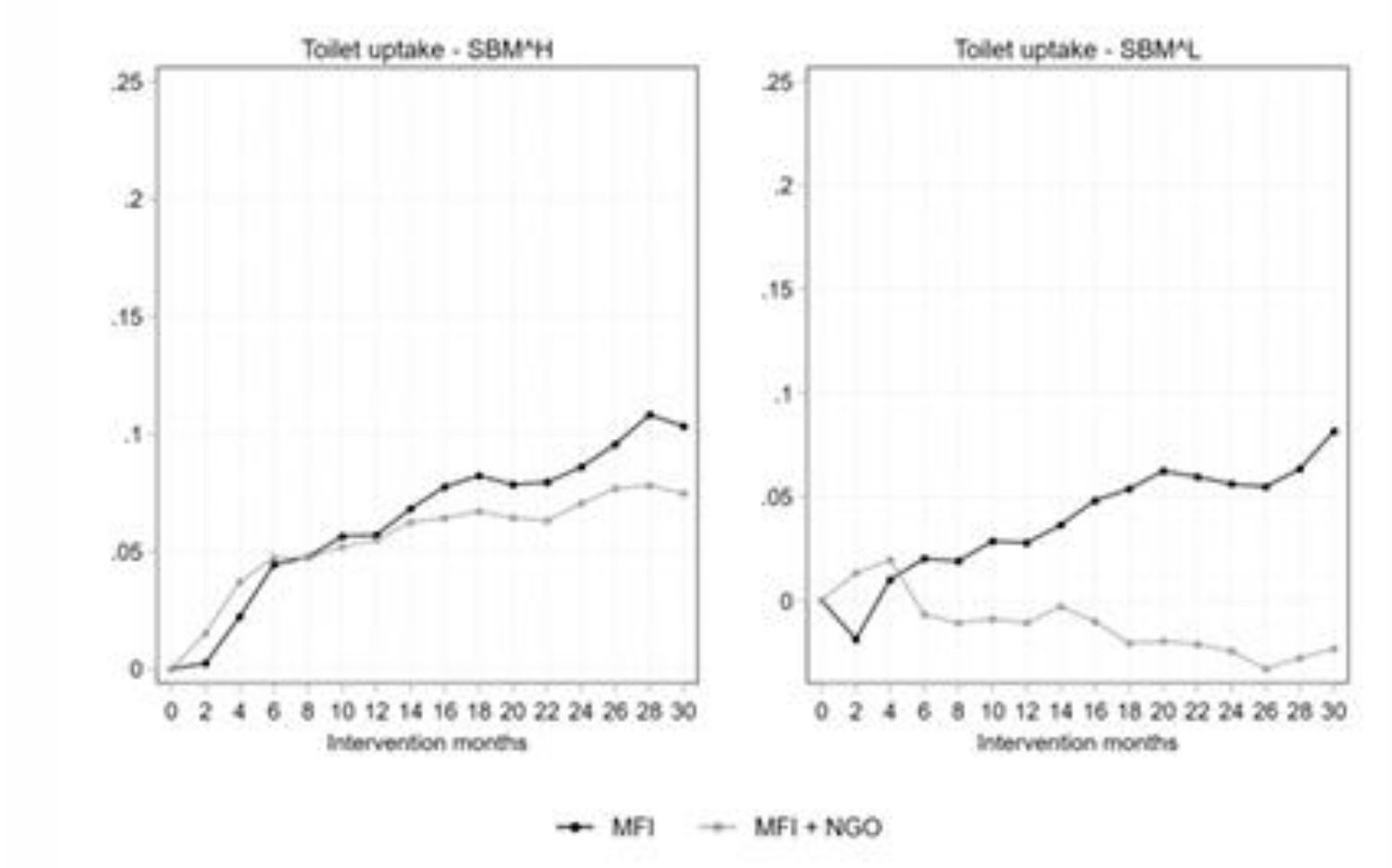
- We show that results are driven by fragmented delivery (and not NGO information per se being a problem) in three steps:

1. NGO info increased demand for sanitation loans in the initial months following rollout, when and where NGO info activities were most salient;



Mechanisms

2. Initial increase in borrowing did not translate into toilet construction in low SBM-G implementation intensity areas;



Mechanisms

3. Failure of loan-to-toilet conversion is driven by delays in the receipt of government subsidies–a central source of organizational fragmentation in our setting.

	Sanitation loan	Functioning toilet
MFI - No major delays	0.1317**	0.1186***
	(0.0508)	(0.0321)
MFI + NGO - No major delays	0.2349***	0.1359***
	(0.0486)	(0.0343)
MFI - Major delays	0.2133***	0.1094***
	(0.0506)	(0.0277)
MFI + NGO - Major delays	0.2115***	-0.0153
	(0.0369)	(0.0282)
Major delays	0.0411	0.1013***
	(0.0415)	(0.0353)
Covariates	Yes	Yes
F_test (no major delays)	0.087	0.665
F_test (major delays)	0.973	0.000
F_test (MFI)	0.263	0.832
F_test (MFI + NGO)	0.707	0.001
Control mean (no major delays)	0.002	0.294
Control mean (major delays)	0.018	0.417
Observations	4009	4009

Notes: Standard errors clustered at the village level are shown in parentheses. Covariates: Toilet ownership at baseline, presence of a child aged 0 - 2 at baseline, ratio of number of sampled clients to village size, strata dummies and interviewer FEs. Definition of major subsidy delays: $>$ 25% of subsidy applicants in the GP experienced major delays in disbursement.

Conclusion

- Our findings show that even when actors pursue aligned objectives and deploy interventions that are effective in isolation, uncoordinated delivery can weaken overall policy impact.
- Ignoring interactions across implementers can lead to systematically misleading expectations about the returns to expanding or layering programs.

⟹ **The relevant question is not only whether an intervention works and can be scaled, but also whether it adds value given what is already being delivered.**

→In our setting, additional NGO involvement was not value-adding for the policy objective, despite being effective in isolation.

- More research needed on how organizational structure and policy delivery interact to shape economic outcomes

Thank You!

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Thank You

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